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Special Article

Avicenna and the *Canon of Medicine:* A Millennial Tribute

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ABŪ ALĪ AL-HYSAYN IBN-'ABD-ALLĀH IBN-SĪNĀ was born in 980 AD in Persia and became one of the most brilliant figures in the history of medicine, acclaimed the "Prince and Chief of Physicians." As a thinker, he represented the culmination of the Islamic renaissance. He was described as having the mind of Goethe and the genius of Leonardo da Vinci; through Hebrew transliteration of his name he is known as Ali ibn-Sina or Avicenna. Most famous as a philosopher, he was also a physician, mathematician, naturalist, geologist, musical theorist, astronomer and poet. He held the political post equivalent to prime minister as well. Dante acknowledged him in the *Divina Comedia,* and Chaucer in the *Canterbury Tales.*

The wealth and power of the Golden Age of Islam that began in the eighth century extended from the border of China to Western Europe. The growth of rationalism gave reason the highest importance in all but the most fundamental articles of faith. It was an age of superb architecture, fine pottery, beautiful silks, music and poetry; talent had free scope and ability was in great demand. Science flourished, making great advances. The professions were dignified—their members wore handsome academic robes and received liberal emoluments, thereby becoming leading and wealthy citizens. Such an age spontaneously creates great men, and Avicenna, while intellectually supreme, was one of many.[1-5]

Medicine attracted the finest and most distinguished personalities. Physicians were in great demand; they were honored and often greatly rewarded. Many hospitals were built with extensive services. Medical education supplemented the apprentice system with formal lectures, clinical demonstrations, group discussions and library research. An examining and licensing system for physicians was established in 931 AD and ethical standards were of the highest tradition of responsibility and integrity. Medicine held a strong attraction for a man of Avicenna's abilities.[5]

More is known of Avicenna than most ancient physicians from an autobiography of his early life, which was later continued as a biography by Juzjāni, a student and follower. By ten years of age Avicenna had memorized the Koran and most of Arabic and Persian literature, "and it was accounted a marvel." He mastered mathematics, astronomy, law and philosophy, and then turned his attention to medicine.

> Medicine is not a difficult science, and in a short space of time, of course, I excelled in it so that the masters of physic came to read with me, and I began to visit the sick. Consequently, there opened to me the doors of various kinds of treatment which I learned by experience. I was then about sixteen years of age. During the period of hard practice and study which then ensued, I never once slept the whole night through. If a problem was too difficult for me, I repaired to the Mosque and prayed, invoking the Creator of all things until the gate that had

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been closed to me was opened and what had been complex became simple. Always, as night fell, I returned to my house, set the lamp before me and busied myself with reading and writing. If sleep overcame me or I felt the flesh grow weak, I had recourse to a beaker of wine, so that my energies were restored.[6]

His father died when Avicenna was 21 years old, and at that point the autobiography ends. Later, Juzjāni continued describing Avicenna's life in his biography.

While serving as a vizier to the Amir of Hamaden he disturbed the army probably with his philosophical teachings, his house was plundered and he was forced into hiding where he worked on the *al-Qanun*. The Amir was stricken with colic, Avicenna was summoned, effected a cure, and he was restored to his office. Later, when the Amir died Avicenna was forced into a quick departure.[6]

Avicenna was a lonely, dissatisfied man who never married. He had a violent temper, with merciless scorn for the mediocre, disdain for conformity and a dedication to the search for truth. With a handsome and imposing presence, he could be charming and witty in conversation and a formidable adversary in debate. A man of immoderate and excessive passions, his days were passed with the affairs of state, practicing medicine and attending the Amir, while the evenings were spent enjoying music, poetry and wine until his guests were asleep or exhausted. Avicenna would then spend the rest of the night finding solutions to the most vexing problems of philosophy and metaphysics. When reproached on his excessive appetites and passions, he replied that he was interested in a life of the fullest breadth, not length, and said "God, who is exhalted, has been generous concerning my external and my internal faculties, so I use every faculty as it should be used."

Physicians in Avicenna's time visited the sick, paying particular attention to each patient's appearance and pulse, and examining the urine. A physician then prescribed a remedy for the patient and was required to give a copy of the prescription to the family. He continued to visit the patient daily and wrote new prescriptions according to his findings, which continued until the patient recovered or died. In the event of a recovery, the physician received his fee and an honorarium. If the patient died, the family took the prescription to the chief physician, officially appointed in each city. If the chief physician said the treatment prescribed was in accordance with the requirements of science and the art of medicine he declared that the person's life was ended by "termination of his allotted span." If he was of a different opinion he said, "exact the blood-money for your kinsman from this doctor, he slew him through negligence and lack of skill."[3]

Avicenna wrote numerous medical books, many in verse,[7] but the most famous was the *al-Qanun* or *Canon of Medicine* (Greek for standard).[8] It contains over a million words in five books titled: (1) General Principles of Medical Practice, (2) Simple Drugs, (3) Local Disease, (4) General Diseases and (5) Compound Medicines. Other comprehensive and systemic compendia of medicine had been written by Avicenna's predecessors, al-Rhazes (841 to 926), and Ali ibn-Ul Abbas (died in 994), but the *al-Qanun* was the final codification of Greco-Arabic medicine, and one of the monumental works of all times. The first four books were based on the principles of Galen and Hippocrates, with the addition of the teachings of Arabic physicians and Avicenna's own observations. The fifth book, a formulary of drugs, was a new Arabic contribution to medicine of inestimable importance. It became a classic as soon as it appeared, and was translated into Latin in 1175 and later into many other languages. The *Canon* finally lost its authoritative status in the 17th century in Europe when autopsies were permitted. Only the Latin translations were from the original Arabic, and are considered so poor that they do not reflect the stature or grandeur of the *Canon,* giving to the West a distorted version of Avicenna's teachings. In 1977 the Institute of the History of Medicine and Medical Research of New Delhi assembled a team of translators to develop an English translation free of errors, using the Istanbul manuscript of 1220 AD, the oldest extant manuscript of the *Canon.*[9]

The *Canon* states the following: "Medicine is the science by which we learn, the various states of the human body, in health, when not in health, the means by which, health is likely to be lost, and when lost, is likely to be restored to health. In other words, it is the art whereby health is conserved and the art whereby it is restored, after being lost." It describes the body's internal milieu and homeostasis, infectious causes of disease and transmission of disease by contagion, heredity, or racial or endemic factors; it also describes "auto-intoxication," psychotherapy and many other modern concepts of medicine.[2] Diseases were categorized according to their degree of heat, cold, dryness and moisture. The principle of

medical treatment was based on the Rule of Opposites:

If a disease originates from heat, it must be treated with cold, if from moisture, then with dryness, etc. If the cause is fear or grief, then the physician must induce tranquility and confidence in his patient, but first, the etiology of the disease must be understood; only then is it possible to begin treatment.

Avicenna's metier was classification, division and subdivision. For instance, in the *Canon* he described 15 types of pain: boring, compressing, corrosive, dull, fatigue, heavy, incisive, irritant, itching, pricking, relaxing, stabbing, tearing, tension and throbbing. In the chapter of sphygmology he described 10 features of the pulse and 22 types of abnormal pulses. In the chapter on urinoscopy great attention was given to the examination of urine—its quantity, odor, color, foam, texture, clearness and sediment, and diseases were classified accordingly.

Analgesic drugs discussed in the *Canon* are remarkably current.

The most powerful of the stupefacients is opium. Less powerful are: Seeds and root barks of mandrake [contains the alkaloid mandragorine, a narcotic and hypnotic]; poppy [morphine and papaverine]; hemlock [conium, an alkaloid that produces motor paralysis without loss of sensation or alteration of consciousness]; white and black hyoscyamus [hyoscyamine and scopolamine with atropine-like effects, cerebral depressant and sedative]; deadly nightshade [belladonna]; lettuce seed [hyoscyamus and mannitol]; snow and ice-water.

Wine served many uses including antisepsis in the irrigation of wounds. Avicenna comments in the *Canon:*

White wine is best for those who are in a heated state, for it does not cause headache. . . . Old red wine is best for a person with a cold, phlegmatic constitution. . . . Wine is beneficial for persons with a predominance of bilious humor, because it gets rid of the excess of this by provoking the urine. It is good for persons of humid temperament because it brings humidities to maturity. . . . If a gnawing feeling comes on after taking wine, take pomegranate, cold water, and a syrup of absynth next morning.[8]

He gave seven rules for a reliable experimental investigation of the effects of drugs in humans that are as stringent as today's standards. All drugs were considered to have the same four properties as disease—heat, cold, dryness and moisture.[2]

The first book devotes great attention to preventive medicine and good health practices are summarized in the "Essential Matters in the Art of Preserving Health"[8] as follows: (1) Equilibrium of temperament; (2) selection of the articles of food and drink; (3) evacuation of the effete matters; (4) safeguarding the composite; (5) maintaining the purity of the air respired; (6) guarding against extraneous contingencies, and (7) moderation in regard to the movements of the body and the motions of the mind, many of which may be "sleep and wakefulness."

Avicenna gave the following advice to the son of a prince, should he be reduced to earning his living by the practice of medicine.

Once you embark on a career as a physician, if you wish to gain experience and reputation you must experiment freely, but you had better not choose people of high rank or political importance as your subjects. To gain confidence you must see a great deal of service in hospitals, where cases of all sorts shall pass under your hands, and where you actually see for yourself what you have read in textbooks. With such training no disease, however rare, will present you with any difficulty and diseases of the internal organs will be no mystery to you. When you visit a patient in his house you must be clean in person and dress and agreeably perfumed. The expression on your countenance should be pleasant and you should go only when you are untroubled in spirit. The physician's encouraging words increase the potency of the warmth inherent in man's natural temperament.[3]

Avicenna was even more famous and influential in philosophy than in medicine and compiled philosophy in the *Kitab al-Shifa* (The Healing). Avicenna's approach to reconciling Aristotelian philosophy with the Moslem religion made it possible in later centuries for similar efforts by Maimonides and Thomas Aquinas regarding Jewish and Christian theology. No Moslem or Oriental scholar has attained as high a position and as strong and lasting an influence in the West as Avicenna, who has been called "the second teacher after Aristotle."[10]

A man as admired and respected as Avicenna excited jealousies and many enemies who declared that his medicines could not save his body any more than his metaphysics could save his soul. He was bitterly attacked as a sorcerer, atheist and mystic ridiculing life, to which Avicenna replied:

They cannot abide my being a physician of merit, it is painful for them to see my merits beside their ignorance. They believe they can hurt me with their slander and calumny, but their slanders and calumnies remind me of a goat who strikes the mountains with his horns.[10-12]

Avicenna's student and biographer, Juzjāni, wrote, "the Master was vigorous in all his faculties, the sexual faculty being the most vigorous and dominant of his concupiscent faculties and he exercised it often. It affected his constitution, upon whose strength he depended." During his final illness he was actively treated by his doctors and poisoned by his servants. Impatient to re-

cover, he over-treated himself, dying in service to the Amir during a military campaign at 58 years of age.

A brilliant and troubled man, Avicenna links ancient physicians with modern medicine. His devotion to the search for truth set the standard for all times. The cultures of both East and West are indebted to this great physician and philosopher, to whom we pay tribute on the 1,000th anniversary of his birth.

Up from Earth's Center through the Seventh Gate
I rose, and on the throne of Saturn sate,
And many a knot unravelled by the road,
But not the Master-knot of Human Fate.

—*The Rubaiyat of Omar Khayyám*[5]

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